Listing of Claims

This listing of claims reflects all claim amendments and replaces all prior versions, and listings, of claims in the application. Material to be inserted is in underline, and material to be deleted is in ~~strikeout~~ or (if the deletion is of five or fewer consecutive characters or would be difficult to see) in double brackets [[ ]].

1-41. (Cancelled)

42. (New) A fuel processing system, comprising:

a reforming region containing at least one reforming catalyst bed and adapted to receive a vaporized feed stream comprising water and methanol;

means for heating the reforming region to a temperature in the range of approximately 300-500° C;

a catalyst within the at least one reforming catalyst bed and adapted to catalyze the formation of a mixed gas stream comprising hydrogen gas and other gases by steam reforming of the feed stream, wherein the catalyst contains a mixture that includes at least 20% zinc oxide, at least 20 wt% chromium oxide, and less than approximately 5 wt% copper oxide; and

a separation region adapted to receive the mixed gas stream and to separate the mixed gas stream into a product hydrogen stream and a byproduct stream, wherein the product hydrogen stream has at least one of a greater concentration of hydrogen gas than the mixed gas stream and a reduced concentration of at least one component of the other gases than the mixed gas stream, wherein the byproduct stream contains at least one of a lower concentration of hydrogen gas than the mixed gas stream and a

greater concentration of at least one component of the other gases than the mixed gas stream.

43. (New) The system of claim 42, wherein the catalyst is non-pyrophoric.

44. (New) The system of claim 43, wherein the catalyst has an initial activity and a second activity after a period of use, the second activity being at least 75% of the initial activity after at least 1000 hours of use.

45. (New) The system of claim 44, wherein the second activity is at least 75% of the initial activity after 2000 hours of use.

46. (New) The system of claim 44, wherein the second activity is at least 75% of the initial activity after 5000 hours of use.

47. (New) The system of claim 42, wherein the catalyst contains copper oxide, with the copper oxide comprising less than 3 wt% of the catalyst.

48. (New) The system of claim 42, wherein the catalyst does not contain copper oxide.

49. (New) The system of claim 42, wherein the catalyst does not contain palladium or platinum.

50. (New) The system of claim 42, wherein the catalyst does not produce methane during the production of the mixed gas stream.

51. (New) The system of claim 42, wherein the catalyst is adapted to not be sintered during production of the mixed gas stream.

52. (New) The system of claim 42, wherein the reforming catalyst bed is an air-permeable catalyst bed that does not require shielding or isolation from air to prevent air from contacting the catalyst.

53. (New) The system of claim 42, wherein the separation region includes at least one hydrogen-selective membrane having a first surface that is exposed to the mixed gas stream, wherein the product hydrogen stream is formed from at least a portion of the mixed gas stream that permeates through the at least one hydrogen-selective membrane, and further wherein the byproduct stream is formed from at least a portion of the mixed gas stream that does not pass through the at least one hydrogen-selective membrane.

54. (New) The system of claim 53, wherein the at least one hydrogen-selective membrane is formed from an alloy comprising palladium and copper.

55. (New) The system of claim 42, wherein the separation region includes at least one pressure swing adsorption system adapted to receive under pressure the mixed gas stream.

56. (New) The system of claim 42, in combination with a fuel cell stack adapted to receive an oxidant stream and at least a portion of the product hydrogen stream and to produce an electric current therefrom.

57. (New) The system of claim 42, wherein the catalyst includes active components, which promote steam reforming of the feed stream, and inactive components, which do not catalyze the steam reforming reaction, and the at least 20 wt% zinc oxide and the at least 20 wt% chromium oxide are active components.

58. (New) The system of claim 42, wherein the catalyst contains 30-70 wt% zinc oxide and 30-70 wt% chromium oxide.

59. (New) The system of claim 42, wherein the catalyst contains 40-60 wt% zinc oxide and 40-60 wt% chromium oxide.

60. (New) The system of claim 42, wherein the catalyst is adapted to convert at least 75% of the vaporized feed stream into hydrogen gas.

61. (New) The system of claim 42, wherein the catalyst is adapted to convert at least 90% of the vaporized feed stream into hydrogen gas.

62. (New) The system of claim 42, wherein the catalyst further contains at least 3 wt% calcium aluminate.

63. (New) In a steam reformer adapted to produce via a steam reforming reaction at a temperature in the range of 300-500° C a mixed gas stream comprising hydrogen gas and other gases from a feed stream comprising water and methanol, the improvement comprising: non-pyrophoric catalytic means comprising at least 20 wt% zinc oxide and at least 20 wt% chromium oxide for steam reforming the feed stream into the mixed gas stream.

64. (New) The steam reformer of claim 63, wherein the catalytic means is further adapted to not produce methane during the production of the mixed gas stream.

65. (New) The steam reformer of claim 63, wherein the catalytic means is adapted to not be sintered during production of the mixed gas stream.

66. (New) The steam reformer of claim 63, wherein the catalytic means has an initial activity and a second activity after a period of use, the second activity being at least 75% of the initial activity after at least 2000 hours of use.

67. (New) The steam reformer of claim 66, wherein the second activity is at least 75% of the initial activity after 5000 hours of use.

68. (New) The steam reformer of claim 63, wherein the catalytic means further comprises copper oxide, with the copper oxide forming less than approximately 5 wt% of the catalytic means.

69. (New) The steam reformer of claim 63, wherein the catalytic means does not include palladium or platinum.

70. (New) The steam reformer of claim 63, in combination with a separation region adapted to receive the mixed gas stream and to separate the mixed gas stream into a product hydrogen stream and a byproduct stream, wherein the product hydrogen stream has at least one of a greater concentration of hydrogen gas than the mixed gas stream and a reduced concentration of at least one component of the other gases than the mixed gas stream, wherein the byproduct stream contains at least one of a lower concentration of hydrogen gas than the mixed gas stream and a greater concentration of at least one component of the other gases than the mixed gas stream.

71. (New) The steam reformer of claim 63, in combination with a fuel cell stack adapted to receive an oxidant stream and at least a portion of the mixed gas stream and to produce an electric current therefrom.

72. (New) The steam reformer of claim 63, wherein the catalytic means includes active components, which promote steam reforming of the feed stream, and inactive components, which do not catalyze the steam reforming reaction, and the at least 20 wt% zinc oxide and the at least 20 wt% chromium oxide are active components.

73. (New) The steam reformer of claim 63, wherein the catalytic means contains 30-70 wt% zinc oxide and 30-70 wt% chromium oxide.

74. (New) The steam reformer of claim 63, wherein the catalytic means contains 40-60 wt% zinc oxide and 40-60 wt% chromium oxide.

75. (New) The steam reformer of claim 63, wherein the catalytic means is adapted to convert at least 75% of the feed stream into hydrogen gas.

76. (New) The steam reformer of claim 63, wherein the catalytic means is adapted to convert at least 90% of the feed stream into hydrogen gas.

77. (New) In a steam reformer adapted to produce via a steam reforming reaction at a temperature of 300-500° C a mixed gas stream comprising hydrogen gas from a feed stream comprising water and methanol, the improvement comprising: catalytic means comprising a mixture that includes at least 20 wt% zinc oxide and at least 20 wt% chromium oxide for steam reforming the feed stream into the mixed gas stream without the production of methane.

78. (New) The steam reformer of claim 77, wherein the catalytic means has an initial activity and a second activity after a period of use, the second activity being at least 75% of the initial activity after at least 2000 hours of use.

79. (New) The steam reformer of claim 78, wherein the second activity is at least 75% of the initial activity after 5000 hours of use.

80. (New) The steam reformer of claim 77, wherein the catalytic means does not contain copper oxide in excess of approximately 5 wt%.

81. (New) The steam reformer of claim 77, in combination with a separation region adapted to receive the mixed gas stream and to separate the mixed gas stream into a product hydrogen stream and a byproduct stream, wherein the product hydrogen stream has at least one of a greater concentration of hydrogen gas than the mixed gas

stream and a reduced concentration of at least one component of the other gases than the mixed gas stream, wherein the byproduct stream contains at least one of a lower concentration of hydrogen gas than the mixed gas stream and a greater concentration of at least one component of the other gases than the mixed gas stream.

82. (New) The steam reformer of claim 81, in combination with a fuel cell stack adapted to receive an oxidant stream and at least a portion of the product hydrogen stream and to produce an electric current therefrom.

83. (New) The steam reformer of claim 77, wherein the catalytic means includes active components, which promote steam reforming of the feed stream, and inactive components, which do not catalyze the steam reforming reaction, and the at least 20 wt% zinc oxide and the at least 20 wt% chromium oxide are active components.

84. (New) The steam reformer of claim 77, wherein the catalytic means contains at least 40 wt% zinc oxide and at least 40 wt% chromium oxide.

85. (New) The steam reformer of claim 77, wherein the catalytic means contains 40-60 wt% zinc oxide and 40-60 wt% chromium oxide.

86. (New) The steam reformer of claim 77, wherein the catalytic means is adapted to convert at least 75% of the feed stream into hydrogen gas.

87. (New) The steam reformer of claim 77, wherein the catalytic means is adapted to convert at least 90% of the feed stream into hydrogen gas.

88. (New) The steam reformer of claim 77, wherein the catalytic means is adapted to steam reform the feed stream into the mixed gas stream while exposed to air.